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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/814,816

03/31/2004

Ligang Zhang

026-0041

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22120

7590

12/14/2007

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EXAMINER

MATTHEWS, COLLEEN ANN

ART UNIT

PAPER NUMBER

2811

MAIL DATE

DELIVERY MODE

12/14/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/814,816

Applicant(s)

ZHANG ET AL.

Examiner

Colleen A. Matthews

Art Unit

2811

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 November 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5, 7-34, 36-39, 41-46 and 48-60 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5, 7-34, 36-39, 41-46 and 48-60 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

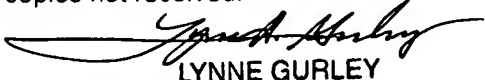
Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.


LYNNE GURLEY
SUPERVISORY PATENT EXAMINER
AV 2811, TC 2800

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.

- 4) ☒ Interview Summary (PTO-413)
Paper No(s)/Mail Date 20071207.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

DETAILED ACTION

Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

Drawings

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the:

electromagnetic shielding structure formed at least partially in on ore more redistribution layers (for example claim 1 line 3)

redistribution metal layer (for example claim 1 line 7)

redistribution dielectric layer (for example in claim 1 line 8)

dielectric layer of the integrated circuit (for example in claim 1 lines 9-10)

passivation layer (for example in claim 3 line 2)

integrated circuit pads (for example in claim 4 line 2)

must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet,

and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-5, 7-34, 36-39, 41-46 and 48-60 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1, 11, 13, 29, 41, and 48 recite the limitation "an electromagnetic shielding structure formed at least partially in one or more redistribution layers." It is unclear how the shielding structure is formed in one or more redistribution layers. As depicted in Figure 5A, shielding structure, surrounds circuit element 525, where the redistribution layers are represented as element 528. It is unclear how elements 502,

508, and 554 of the shielding structure are "formed at least partially in one or more redistribution layers."

Claim 13 recites the limitation "***an electromagnetic shielding structure*** formed at least partially in one or more redistribution layers ***formed on an integrated circuit die***" and then recites "wherein ***the sidewalls of the electromagnetic shielding structure*** are formed at least in part by via structures ***in the integrated circuit die.***" It is unclear if the electromagnetic shielding structure, its top plate, sidewalls and bottom plate are to be formed ***on*** or ***in*** or partially on and partially in the integrated circuit die.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 13-14 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S.

Pat. No. 6,037,649 to Liou.

Regarding claim 13, as far as the claim can be understood, Liou discloses an apparatus comprising:

an electromagnetic shielding structure (Figures 3A-3B, elements S1, S2 and S3 respective via interconnects 24 and 27; col 4 lines 48-53) formed at least partially in one or more redistribution layers (isolation layers such as 26 and 23 and metal layers such as S1,S1,S3, M1,M2, M3 provide for electrically redistribution of current) formed on an

integrated circuit die (10), the electromagnetic shielding structure (elements S1, S2 and S3 respective via interconnects 24 and 27) substantially surrounding a circuit element (shielding substantially surrounds circuit element that is a inductor made in metal layers M1, M2, M3),

wherein the electromagnetic shielding structure has a top plate (S3, for example), a bottom plate (S2, for example), and sidewalls (vias 27, for example),

wherein the sidewalls of the electromagnetic shielding structure are formed at least in part by via structures (27) in the integrated circuit die (10).

Regarding claim 14, as far as the claim can be understood, Liou discloses the apparatus of claim 13 wherein the sidewalls (vias 24, 27) of the electromagnetic shield structure (S1, S2, S3 and respective via interconnects) are formed at least in part by solid via structures (24, 27) in the redistribution layers.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 11-12 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Pat. No. 6,037,649 to Liou in view of U.S. Pat. No. 6,847,282 to Gomez et al. (Gomez).

Regarding claim 11, as far as the claim can be understood, Liou discloses an apparatus comprising:

an electromagnetic shielding structure (Figures 3A-3B, elements S1, S2 and S3 respective via interconnects 24 and 27; col 4 lines 48-53) formed at least partially in one or more redistribution layers (isolation layers such as 26 and 23 and metal layers such as S1, S1, S3, M1, M2, M3 provide for electrically redistribution of current) formed on an integrated circuit die (10), the electromagnetic shielding structure (elements S1, S2 and S3 respective via interconnects 24 and 27) substantially surrounding a circuit element (shielding substantially surrounds circuit element that is a inductor made in metal layers M1, M2, M3),

wherein the electromagnetic shielding structure has a top plate (S3, for example), a bottom plate (S2, for example), and sidewalls (vias 27, for example).

Liou fails to explicitly disclose the sidewalls of the electromagnetic shielding structure formed by under bump metal. Gomez discloses electromagnetic shielding structures formed by under bump metal (copper, col 3 lines 28-38). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Liou to have the electromagnetic shielding structure, including the sidewalls, be formed by under bump metal as in Gomez in order to provide for high conductivity in the shielding structure.

Regarding claim 12, Liou discloses the apparatus of claim 11 where the top plate (S3, for example) is support by via structures (vias 27, for example) formed in the

redistribution layers (isolation layers such as 26 and 23 and metal layers such as S1,S1,S3, M1,M2, M3 provide for electrically redistribution of current).

Regarding claim 18, Liou discloses the apparatus of claim 11, where the redistribution layers include at least one redistribution metal layer (metal layers such as S1,S1,S3, M1,M2, M3) and at least one redistribution dielectric layer (isolation layers such as 26 and 23)

Response to Arguments

Applicant's arguments with respect to claims 1-5, 7-34, 36-39, 41-46 and 48-60 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Colleen A. Matthews whose telephone number is 571-272-1667. The examiner can normally be reached on Monday - Friday 8AM-4:30PM.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lynne Gurley can be reached on 571-272-1670. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

CAM 12/07/2007


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